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Preliminary Evaluation of Compost for Potting Media Mixtures

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Objective

The purpose of this experiment was to evaluate the potential for the use of composted waste materials as an organic constituent in a potting mix for container production of ornamental plants.

With an increasing demand for container-grown plant materials for use within Hawaii and for shipment to the mainland United States, the need for a soilless growing medium made with locally available materials has become more important. One such mix proposed by Voss and Watson (1968) was composed of volcanite, a trachyte-pumice volcanic material from a specific cinder cone on the island of Hawaii, mixed with wood shavings. Because supplies of wood shavings are limited, and due to recent interest in composting waste products from animal industries, it was decided to test these materials to determine if they could be used as a satisfactory substitute for wood shavings as an organic amendment for growing plants in a volcanite mix.

Methods

This experiment consisted of a variety of ornamental plant materials grown in two potting mixes: the standard 1:1 (v:v) volcanite:wood-shavings mix compared to a 1:1 (v:v) volcanite:compost mix. The compost was from the third batch of composting experiments conducted jointly by CTAHR's Departments of Animal Sciences and Biosystems Engineering. The compost consisted of equal parts animal waste and waste paper from the public school lunch program. Each mix was amended with 6 oz Osmocote 18-6-12, 7 oz dolomitic lime, and 7 oz superphosphate per cubic foot of mix.

Seven test plants were used in this trial: oleander (*Nerium oleander*), Chinese hibiscus (*Hibiscus rosa-sinensis*), Carmencita bougainvillea (*Bougainvillea glabra* 'Carmencita'), Gold-dust croton (*Codiaeum variegatum* 'Gold-dust'), Japanese privet (*Ligustrum japonicum*), Golden Prince panax (*Polyscias filicifolia* 'Golden Prince'), and White Spider chrysanthemum (*Chrysanthemum* 'White Spider'). Rooted liners were potted into 6-inch black plastic nursery containers, one plant per container, with the exception of chrysanthemums which were planted three cuttings per pot, replicated three times. Growth response was determined by height increase, and breaks were noted along with any abnormal plant responses. Soil samples were taken at the start of the trial and at its conclusion for analysis by the CTAHR Agricultural Diagnostic Service Center (ADSC).

Results

The analysis by the ADSC of the two mixes at planting time showed that they were similar, except for higher levels of magnesium and soluble salts in the compost mix (Table 1).

Plant height measurements were made on all plants at planting time and again after 10 weeks, with the increase in plant height shown in Table 2. Very little difference was found between the plants growing in the

Table 1. Analysis of volcanite potting mixes with two organic amendments used for the production of selected ornamental container plants.

	At planting		20 weeks later	
	Wood shavings	Compost	Wood shavings	Compost
Nutrient (lb/acre)				
Phosphorus	200	200	>200	>200
Potassium	320	240	>320	>320
Calcium	6000	6000	6000	6000
Magnesium	325	750	250	250
pH	6.4	6.2	6.9	6.8
Salinity (mmho/cm)	3.2	8.8	0.8	1.7

two potting mixes. Observation of the plants showed that hibiscus and oleander were darker green when grown in the compost mix than when grown in the wood-shavings mix.

The growth measurements from the White Spider chrysanthemum plants are shown in Table 3. The average plant height was greatest in the wood-shavings mix, but the plants growing in the compost mix were fuller and more compact, as indicated by the higher fresh weight per plant and the increased number of lateral breaks. In addition, the plants growing in the compost mix were darker green than those in the wood-shavings mix.

Analyses of media samples taken at the conclusion of the chrysanthemum trial are shown in Table 4. There was very little difference between the two mixes at that time. However, there was a slight increase in pH and a decrease in soluble salts levels compared to the samples taken at potting time (Table 1).

These preliminary results suggest that the composted waste materials make a satisfactory organic component for a volcanite potting mix for the production of a variety of ornamental container plants. The better green color of some of the plants growing in the compost mix may be due to the higher nitrogen levels of the animal waste (N was not analyzed). Additions of fertilizer to the wood-shavings mix may result in plants with improved color.

Literature cited

Voss, R.L., and D.P. Watson. 1968. UH potting mix. Univ. of Hawaii, Extension Circular 424.

Table 2. The increase in height (cm) of ornamental plants grown in volcanite with two organic amendments at 10 and 20 weeks after planting (average of three plants).

	10 weeks		20 weeks	
Plant material	Wood shavings	Compost	Wood shavings	Compost
Oleander	30	33	36	40
Hibiscus	55	47	60	59
Croton	11	6	—	—
Bougainvillea	38	35	45	55
Privet	8	3	21	11
Golden panax	10	11	—	—

Table 3. The growth of white spider chrysanthemum grown in volcanite with two organic amendments after 16 weeks.

Organic amendment	Height increase[x] (cm)		No. of breaks		Fresh weight (g)	
Wood shavings	32.2	a[y]	7.8	a	34.0	a
Compost	27.5	b	9.6	a	46.4	b

[x]Average of nine plants.
[y]Mean separation within columns by Duncan's multiple range test, 5%.

Table 4. Analysis of volcanite potting mixes with two organic amendments used to produce White Spider chrysanthemums.

	At planting		20 weeks later	
	Wood shavings	Compost	Wood shavings	Compost
Nutrient (lb/acre)				
Phosphorus	200	200	200	200
Potassium	320	240	320	320
Calcium	6000	6000	5000	6000
Magnesium	325	750	750	750
pH	6.4	6.2	7.0	6.9
Salinity (mmho/cm)	3.2	8.8	1.3	2.4